# PUBLIC SAFETY RADIO COMMUNICATIONS PLAN



## For Region 4

# PUBLIC NOTICE

FEDERAL COMMUNICATIONS COMMISSION
1919 M STREET N.W.
WASHINGTON, D.C. 20554

PR 93-3

PR 93-34

News media information 202/632-5050. Recorded listing of releases and texts 202/632-0002.

January 13, 1993

**COMMENTS INVITED ON ARKANSAS PUBLIC SAFETY PLAN**

The Commission has received the public safety radio communications plan for Arkansas (Region 4).

In accordance with the Commission's Memorandum Opinion and Order in General Docket 87-112, Region 4 consists of the state of Arkansas. (General Docket No. 87-112, 3 FCC Rcd 2113 (1988)).

In accordance with the Commission's Report and Order in General Docket No. 87-112 implementing the Public Safety National Plan, interested parties may file comments on or before **February 22, 1993** and reply comments on or before **March 9, 1993**. (See Report and Order, General Docket No. 87-112, 3 FCC Rcd 905 (1987), at paragraph 54.)

Commenters should send an original and five copies of comments to the Secretary, Federal Communications Commission, Washington, D.C. 20554 and should clearly identify them as submissions to **PR Docket 93-3 Arkansas-Public Safety Region 4.**

Questions regarding this public notice may be directed to Betty Woolford, Private Radio Bureau, (202) 632-6497 or Ray LaForge, Office of Engineering and Technology, (202) 653-8112.

- FCC -

DOCKET FILE COPY ORIGINAL

PR 93-3



November 20, 1992

Ms. Donna Searcy
Secretary
Federal Communications Commission
Washington, DC 20554

Dear Ms. Searcy:

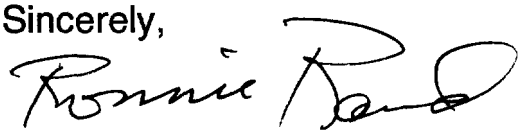
As chairperson of the Region 4 National Public Safety Planning Advisory Committee (NPSPAC), I am proud to present for your consideration our committee's Frequency Utilization Plan for the State of Arkansas formulated in accordance with FCC Dockets 87-112 and 87-359.

On February 10, 1988, the Region 4 convenor issued a Public Notice that an initial Region 4 Public Safety Planning meeting would be held on April 14, 1988, at the Robinson Convention Center (see appendix 8). In addition to this notice, I sent an invitation to all the Police Chiefs, Fire Chiefs, County Judges, City Managers of the state of Arkansas and the Governor's Office. This initial regional planning meeting officially established the Region 4 Planning Committee and its Subregions with Ronnie Rand elected as Chairperson by the quorum (see appendix 9). Participants in that meeting represented Public Safety Radio Services, Special Emergency Radio Service and Vendor Community. Please note that the vendors participation was encouraged, but they were not allowed to vote.

As chairperson of the Region 4, I compiled all the inputs from the Regional Planning Committee Members and developed the final draft.

This final document is outstanding proof that a diverse group of individuals and organizations ranging from Police, Fire, Federal Government, State Government, Local Government, Emergency Management can work together effectively for the good of the community and citizens they serve.

Sincerely,



Ronnie Rand, Chairperson
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## PROGRAM SCOPE

### INTRODUCTION

In December 1983, the United States Congress directed the Federal Communications Commission (FCC) to establish a plan to ensure that the communications needs of state and local public safety authorities would be met. By Notice of Inquiry, over 300 comments were evaluated by the FCC staff. This resulted in the recognition of public safety agency needs and the subsequent allocation of an additional 6 megahertz of spectrum for public safety use nationwide. The FCC also recognized the necessity of developing a National Plan to promote interoperability among public safety providers and to ensure an efficient use of the newly allocated spectrum.

Recognizing the importance of public safety participation in the development of the National Plan, the FCC established the National Public Safety Planning Advisory Committee (NPSPAC). With open membership, NPSPAC provided the opportunity for the public safety community and other interested members of the public to participate in an overall spectrum management approach by recommending policy guidelines, technical standards, and procedures to satisfy public safety needs for the foreseeable future.

After consideration of NPSPAC's Final Report and comments filed in Docket No. 87-112, a Report and Order was released by the FCC in December 1987 which established a structure for the National Plan that consists of guidelines for the development of regional plans.

The National Plan reflects the FCC's regulatory objective of maximizing spectrum efficiency and ensuring sufficient flexibility to accommodate specific communications requirements in different areas of the United States. The National Plan will serve as an umbrella under which regional plans can be developed and implemented.

The National Plan provides guidelines for the development of regional plans, with as much regional autonomy as possible, to ensure that the needs of all eligibles are considered in the planning process.

### PURPOSE

Public safety spectrum users within the boundaries of Region 4 recognize that spectrum is a highly valued and limited resource which necessitates an orderly and efficient development of its use. Within Region 4, there are numerous governmental entities (both metropolitan and rural) which require new and/or additional communications capabilities in order to maintain a satisfactory level of public safety services for their citizens.

This Regional Plan was developed with the objective of assuring that unassigned frequencies would be distributed in an equitable fashion to those public safety and special emergency radio service eligibles with the highest demonstrated need and that the frequencies would be assigned and used in the most efficient manner possible.

The purpose of this regional plan is to define, under the umbrella of the National Plan, specific users and their spectrum requirements, regional interoperability requirements, technical and frequency reuse requirements, and other requirements that may be applicable to Region 4 and adjacent regions. This plan provides flexibility to accommodate a wide variety of specific communications requirements which are needed for this region's public safety and special emergency service providers.

## REGIONAL PROFILE

### Geography

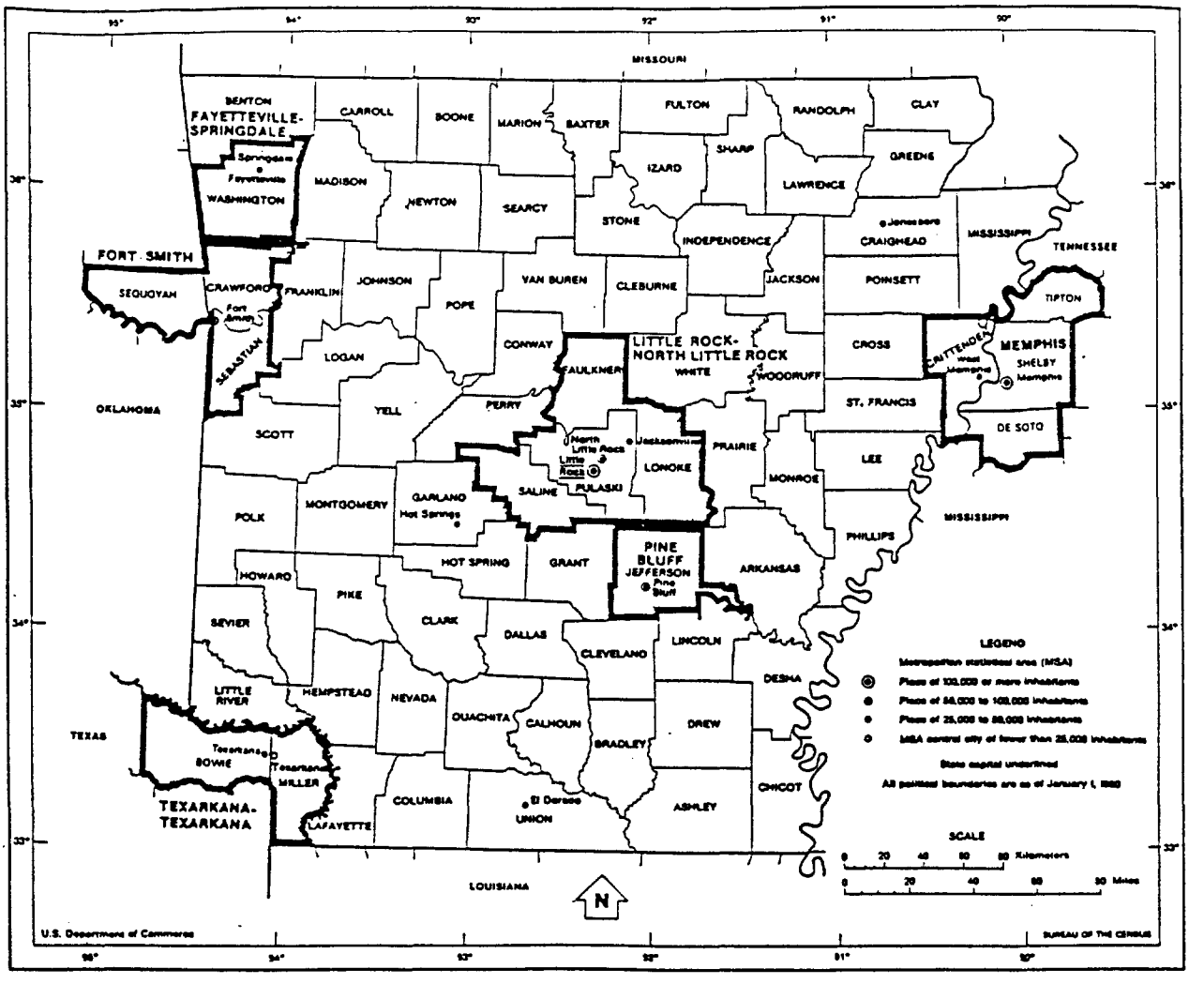
The 75 county area included in this Plan is shown by the map, "Public Safety Communications Planning Region - Region 4," on the following page. Region 4 typifies geographical diversity from its rich farmland in the southeast to fairly hilly semi-mountainous terrain in the northwest. Much of the Region's area is extensive from the standpoint of public safety officer coverage. There are times when only a few officers may be responsible for covering an area greater than several hundred square miles. Appendix 1 "Region 4 - Square Miles and Population By County," gives the square mile area for each county in the region. The total number of square miles in Region 4 is 52,078.

### Population - Current and Projected

The 75 county region has experienced steady, if not dramatic growth during the late 1970's and early 1980's. However, as noted in Appendix 2, "Projected Population and Employment - Region 4," and Appendix 3, Population Projections of Arkansas Counties, 1990, 1995 and 2000," the Region will continue to exhibit growth through the year 2000. 32 of 75 counties are projected to experience double digit percentage increases in population. The implications of this growth are that Region 4 will experience added service requirements requiring improved radio communications capabilities.

### Housing and Labor Market Trends

The average household size declined from 3.05 in 1970 to 2.62 in 1986, and accompanying the smaller households has been a shift towards multifamily housing. In 1970, 86 percent of all




| County | Land Area 1980 (Sq. Mi.) | County | Land Area 1980 (Sq. Mi.) | County | Land Area 1980 (Sq. Mi.) | County | Land Area 1980 (Sq. Mi.) |
|---|---|---|---|---|---|---|---|
| ARKANSAS | 52,078 | | | | | | |
| Arkansas | 1,006 | Dallas | 668 | Lee | 602 | Pope | 820 |
| Ashley | 934 | Desha | 746 | Lincoln | 562 | Prairie | 656 |
| Baxter | 546 | Drew | 831 | Little River | 516 | Pulaski | 767 |
| Benton | 843 | Faulkner | 645 | Logan | 717 | Randolph | 656 |
| Boone | 584 | Franklin | 609 | Lonoke | 783 | St. Francis | 638 |
| Bradley | 654 | Fulton | 616 | Madison | 837 | Saline | 725 |
| Calhoun | 628 | Garland | 657 | Marion | 587 | Scott | 896 |
| Carroll | 634 | Grant | 633 | Miller | 619 | Searcy | 668 |
| Chicot | 649 | Greene | 579 | Mississippi | 896 | Sebastian | 535 |
| Clark | 867 | Hempstead | 725 | Monroe | 609 | Sevier | 560 |
| Clay | 641 | Hot Spring | 615 | Montgomery | 774 | Sharp | 606 |
| Cleburne | 551 | Howard | 574 | Nevada | 620 | Stone | 605 |
| Cleveland | 599 | Independence | 763 | Newton | 823 | Union | 1,053 |
| Columbia | 767 | Izard | 581 | Ouachita | 737 | Van Buren | 709 |
| Conway | 558 | Jackson | 633 | Perry | 550 | Washington | 951 |
| Craighead | 713 | Jefferson | 882 | Phillips | 685 | White | 1,040 |
| Crawford | 594 | Johnson | 676 | Pike | 598 | Woodruff | 592 |
| Crittenden | 599 | Lafayette | 518 | Poinsett | 762 | Yell | 930 |
| Cross | 622 | Lawrence | 589 | Polk | 860 | | |

PUBLIC SAFETY COMMUNICATIONS PLANNING REGION 4, ARKANSAS

households resided in single family dwellings. By 1980, that proportion dropped to 79 percent, and is predicted to drop to 71 percent by 2000. This continued trend toward a higher percent of multifamily dwellers and the accompanying high densities of population will impact future police, fire, and emergency medical planning and services.

As a result of rapidly increasing labor force participation among women, population growth will not occur as rapidly as job growth. One implication of the two-earner household is the increased potential for unstable family structures and resultant social consequences. For example, many children will be unsupervised and possibly more prone to commit criminal and mischievous acts. Also, more property is left unprotected because both adults may be away from home.

Emergency Medical Services

Appendix 4, "Emergency Medical Services Information," depicts Emergency Medical Services manpower and selected capabilities in Region 4. It is anticipated that the number of EMS personnel will increase approximately 21 percent during the period 1989-1995. Given this increase, the number of EMS services personnel will be 4828. This increase in personnel will result in a corresponding increase in the need for vehicles, supplies, and communications equipment to handle increased communications traffic.

Law Enforcement Capabilities

Appendix 5, "Number of Full-Time Law Enforcement Employees in Region 4," reflects the number of sworn and civilian employees' in selected jurisdictions as of 1987.

The number of law enforcement officers is expected to increase approximately 4 percent during the period 1987 through 1989, resulting in a sworn manpower complement exceeding 3,500 by the beginning of the next decade. The need for additional radio equipment and communications capabilities in the region is obvious and existing systems are often less than adequate to assure reliable, prompt, and accurate communications. Local agencies are willing to examine technological advances in an attempt to remedy existing problems, but there will still be a need for additional frequencies if citizens are to be effectively served and officers protected.

Index Crime

Not unlike other parts of the county, communities in Region 4 continue to experience an increase in criminal activity and a resulting increase in calls for services. As shown in Appendix 6, "Region 4 Uniform Crime Reporting" the number of Index Crimes

reported in the 75 county region has increased from 84,952 in 1983 to 100,986 in 1987 - an increase of 16 percent. The rate per 100,000 population has increased 17.3 percent, from 3,622.8 in 1985 to 4274.9 in 1987. The number of arrests for Index offenses has increased from 17,963 in 1984 to 19,546 in 1987, or a 9.3 percent increase. This is also statewide data for the reported period.

Fire Service Capabilities

Fire service in Region 4 is characterized by a mix of full-time professional officers with a large number of professional volunteer personnel. Appendix 7, "Fire Service Organizations By County and Jurisdiction," reflects the number of organized fire departments available to respond to emergency calls for fire service. Not unlike the law enforcement community, many of the fire departments in Arkansas cannot expand their communications capabilities to meet increasing demands for service. The opportunity to receive additional frequencies will help identify existing impacted frequencies and result in a more effective fire service operation.

## PLANNING COMMITTEE FORMATION

The development of the Public Safety Radio Communications Plan for Region 4 has followed the requirements of the FCC's Report and Order as issued in the matter of General Docket 87-112.

Representatives of the Arkansas public safety community and state and local government personnel began the cooperative regional planning process for Region 4.

In accordance with the FCC's Report and Order 87-112, the Associated Public Safety Communications Officers Inc. (APCO) recommended to the Commission the appointment of a "Convener" for Arkansas Region 4. Ronnie Rand, Manager, Little Rock Office of Emergency Services, was APCO's appointee.

The Commission has defined the limits of Region 4 as a 75 county area which coincides with the state borders of Arkansas (please see page 3). On February 10, 1988, the Region 4 convener issued a Public Notice that an initial Region 4 Public Safety Planning meeting would be held April 14, 1988, at the Robinson Convention Center (please see Appendix 8). This initial regional planning meeting officially established the Region 4 Planning Committee with Ronnie Rand elected Chairman by the quorum (see minutes of the initial meeting, Appendix 9). All official actions of the Region 4 Planning Committee are attached as Appendix 10.

## AUTHORITY

### REGIONAL PLANNING COMMITTEE

Authority for the Regional Planning Committee to carry out its assigned tasks is derived from the Federal Communications Commission, Report and Order, Docket 87-112. Participants in the formation of the Regional Planning Committee represent interested parties from both the Public Safety and Special Emergency Radio Services. A total of 80 individuals have participated in the plan development process. Appendix 10 contains the names, organization affiliations, and mailing addresses of all participants in the Regional Planning Committee formation.

### PLAN REVIEW

After compiling all written inputs to the Regional Plan, the Regional Planning Committee reviewed the completed draft in detail. Using the page by page review and explanation procedure by which NPSPAC approved its final report, the Regional Planning Committee approved the draft plan. The draft was then submitted to the appointed conveners and/or planning committee chairmen of the six adjacent regions for their review.

### CONFLICTS

It is not the intent of this plan to conflict with any current or future rule or regulation of the National Plan as may be applicable by Report and Order of the Federal Communications Commission. In such cases where conflicts may exist, Federal Communications Commission rules and regulations shall prevail.

Elements of this Plan not expressly prohibited by the FCC become applicable to this region upon the Plan's approval by the Commission. Should future determinations by the Commission void any individual element of this plan, all other elements will remain applicable.

This Plan is not intended to interfere with the work of organizations appointed by the Commission to provide frequency coordination recommendations to the Commission for eligibles covered by the Plan. Instead, it provides a structure by which spectrum conservation and efficiency can be maintained. Resolution of any arising conflict is left to the judgement of the Commission.

## REGIONAL REVIEW COMMITTEE

Upon approval of this Plan by the Commission, a Regional Review Committee will be established for the review of new applications, for conducting an annual system implementation, for making action recommendations to the Commission, for the resolution of inter-regional problems, for recommending modifications and amendments to the Plan, and for exercising general oversight of the Plan.

To ensure organizational integrity, the Regional Review Committee shall be attached to and serve under the sponsorship of the four subregions comprising Region 4. At a minimum, each subregion will be represented by one (1) member, appointed by the regional planning committee chairman, which shall be the chairman of that subregion. Most Committee members will be employees of an official entity responsible, under Arkansas Statute, for the preservation of life and property as a matter of public safety.

The Regional Planning Committee Chairman shall serve as chairman of this Committee. At the direction of the Regional Review Committee, the chairman shall forward Regional Plan Modifications and amendments to the Commission for its action. The APCO frequency advisor responsible for Region 4 will serve as an ex-officio, non-voting member of the Committee.

The Regional Review Committee shall establish its rules and operating procedures as it deems necessary.

Upon request by any party or upon resignation of the chairman, a public notice will be made in a newspaper of general circulation calling for a meeting of all interested parties to elect a new chairman.

Review Comm

# Operational Requirements

## OPERATIONAL REQUIREMENTS

REGIONAL INTEROPERABILITY (Common Channels)

In accordance with the national band plan for 821-824/866-869 MHz, interoperability among federal, state, and local governments during both routine and disaster operations will take place primarily on the five common channels as identified in the National Plan. Additionally, through the use of SW-160 or equivalent agreements, a licensee may permit federal use of a non-federal communications system. Such use, other than the five common channels, is to be in full compliance with the Commission's requirements for government use of non-government frequencies (Title 47 CFR, Sec. 2.103). Licensees are allowed to count as additional loading, a factor of two percent for federal interoperability agreements. No channels other than the five national common channels are needed to meet this region's interoperability requirement.

The implementation of the common channels designated by the National Plan will be separated into two categories of users: primary and secondary.

Primary Users: (five or more channels)

As a minimum, all primary users shall operate a receiver for continuous monitoring of the national calling channel and a separate mobile relay base station equipped to operate on all five national common channels. All primary users shall maintain a radio watch on the calling channel for the purpose of monitoring the channel and rendering assistance. All common channel equipment shall be equipped to provide an on-street coverage capability of the same size and quality for which the station license was granted. All licensees are encouraged to operate additional base stations on any or all of the four remaining common channels.

Secondary Users: (four or less channels)

All secondary users shall, as a minimum, operate a base station for continuous monitoring of the national calling channel. All secondary users shall maintain a radio watch for the purpose of monitoring and rendering assistance on the calling channel.

A secondary user whose area is encompassed by a primary user may apply for a waiver from the Regional Review Committee for full time monitoring of the national calling channel. The secondary user will be required to have a station on the national calling channel.

## CHANNEL USE

Plain language will be used on all five common channels at all times, and the use of unfamiliar terms, phrases or codes will be kept to a minimum, unless deemed necessary for security purposes.

The use of these channels for intra-system normal dispatch and routine agency operations is strictly prohibited.

Normally, the five common channels are to be used only for activities requiring communications between agencies not sharing any other compatible communication system. Under emergency situations, one or more tactical channels may be assigned by the controlling agency at the time of the incident.

Users of these channels include federal, state and local disaster management agencies, police, fire, and providers of basic and advanced life support services. Other eligibles, such as school buses, volunteer emergency corps, Red Cross, Radio Amateur Civil Emergency Service (RACES), Amateur Radio Emergency Service (ARES), Salvation Army, etc., under the National Plan may also participate on a secondary basis in support of the preservation of life and property during an emergency. These eligibles may be called upon by the controlling agency when specifically enrolled in a documented emergency plan of a recognized emergency management agency.

The use of automatic or operator-assisted connection of these common channels to the switched telephone network is prohibited.

## CALLING CHANNELS

The calling channel shall be used to contact other users in the region for the purpose of requesting incident related information and assistance. This channel shall not be used as an ongoing working channel. Once contact is made, an agreed upon tactical channel is recommended for continued communications.

## TACTICAL CHANNELS (TAC1 - TAC4)

These channels are reserved for use by those agencies in need of conducting interagency communications. Incidents requiring multi-agency participation will be coordinated over these channels by the agency controlling the incident. Individual tactical channels may be designated for use by various services or disciplines on an incident basis by the controlling agency. In the event of multiple incidents requiring the use of these channels, channels shall be designated by mutual agreement between controlling agencies. In no case shall control of these channels remain with any single agency beyond the termination of a declared emergency.

## CODED SQUELCH

All mobile and portable radios operating in the 821-824/866-869 MHz band shall be equipped to operate on the five common channels using CTCSS tone squelch of 156.7 Hz.

All mobile relay base stations operating on these common channels shall be equipped to operate using CTCSS tone squelch of 156.7 Hz. They shall be equipped to operate as a mobile relay station on demand, but shall normally operate in the repeat disable mode.

## APPLICATION PROCEDURES

Any request for frequencies to be used for public safety operations (as described in part 90 of the FCC rules and regulations) must be submitted through the FCC authorized coordinator, APCO AFC, Inc.

If adequate spectrum is available, the Regional APCO Frequency Advisor shall review the application to determine its compliance with the regional plan as indicated below. If there is inadequate spectrum or he anticipates a shortage, the established evaluation procedure shall be instituted. This procedure, "Evaluation Criteria," is outlined in Appendix 13.

If approved by the Regional APCO Frequency Advisor, the request for frequencies will be returned to the applicant to be forwarded to the Associated Public Safety Communications Officers (APCO) for frequency coordination. If not approved by the Regional APCO Frequency Advisor, the request will be returned to the applicant for revision and correction before being resubmitted for further consideration.

The request shall contain information to justify the frequencies requested and shall demonstrate compliance with the regional plan. As a minimum, this request shall consist of the following:

1. Appropriate Coordination and Licensing Application Forms

2. System Design Information

3. Funding Statement

4. Proposed Implementation Schedule

5. Existing Frequency Statement

The requesting jurisdiction may appeal a negative decision of the Regional APCO Frequency Advisor to the APCO AFC, Inc. Director. If the petitionor is still dissatisfied, he may appeal to the FCC.

Any jurisdiction utilizing an 800 MHz trunked radio system licensed before FCC approval of this plan may petition for expansion of an existing system utilizing this spectrum allocation if no other frequencies are available. Such approved expansion would exempt the user from requirements of this plan. The Regional APCO Frequency Advisor will apprise the Director of APCO AFC, Inc.

## EVALUATION PROCEDURES

The Regional APCO Frequency Advisor will review and evaluate each request based on the sufficiency of the information contained in the five sections listed earlier. The information required in each section includes the following:

System Design

A brief statement of the intended use of the requested frequencies and how they will be integrated into the existing emergency and nonemergency operations will be required. The efficiency of 800 MHz frequencies depends greatly upon the design and programming of the system itself. To assist all public safety users in making all systems operate in an efficient manner is the reason this area is being included for review. Specific criteria regarding system parameters are defined in the section, "System Technical Design Requirements."

Funding Statement

The applicant's commitment to implement the system must be ensured to maintain the efficient utilization of these 800 MHz frequencies. The funding statement, which will be a resolution from the applicant's governing body, will include the method by which the system will be funded; for example, by Certificates of Obligation or local bond funds.

Implementation Schedule

The applicant will be requested to furnish a schedule detailing the time period required to implement the proposed communication system, from funding through turn-on and final acceptance.

Existing Frequency Statement

The applicant should provide an explanation of how existing frequencies will either be used by the applicant or released to other jurisdictions for their use. Time frames for the release of frequencies for reassignment should be included in the implementation schedule submitted with the request.

# Technical Design Requirements

## TECHNICAL DESIGN REQUIREMENTS

COVERAGE LIMITATION - Antenna Height and Power

System coverage or service area is limited to geographical boundaries in order to maintain maximum frequency reuse within the region. Agencies requesting new or additional channels will have their proposed system design evaluated by the Regional Review Committee. Any agency requesting a transmitter location not centrally located within its jurisdiction must include in their request adequate justification for such placement. If a non-centrally located transmitter may result in significant encroachment on surrounding jurisdictions, a directional antenna must be chosen which will minimize this encroachment.

Agencies with service areas outside their political boundaries may request extended system coverage. Such requests for extended coverage must be accompanied by written justification.

Extended coverage systems will not be authorized unless approved by the Regional Review Committee. Favorable consideration will be given to those extended coverage systems which are made available for use by eligibles other than the licensee.

DEFINITION OF SERVICE AREA

"System Coverage" or "Service Area" is defined as the boundary where received signal strength falls to 41 dBu.

DBu is a measure with one microvolt as a reference. Forty-one (41) dBu was selected by combining receiver sensitivity for 20 dB quieting (-6 dBu or 0.5uV) with a factor of 10 dB for foliage attenuation, 20 dB margin for Rayleigh fading (98 percent probability), and portable body loss of 16 dB.

CALCULATION OF SERVICE AREA

Three factors must be known to determine service area: (1) the strength of the received signal, i.e., "received signal strength," (2) antenna height above average terrain (HAAT), and (3) the effective radiated power (ERP). Received signal strength has been defined, leaving two factors that can be modified to achieve the desired coverage. Tabulated data from Carey propagation curves in Appendix 12 will be used to give the distances to the 41 dBu boundary based on HAAT and ERP. This distance is considered the radius of coverage from the transmitting site. A step-by-step procedure is provided in Appendix 14.

It will be permissible for agencies requesting system authorization to determine the distance to the 41 dBu boundary on a radial-by-radial basis, with a minimum of eight equally spaced radials at 45 degree intervals, beginning at true north, and plot the service area boundary based on these points. This plot may be submitted with the request for frequencies to show that service areas outside the agencies' political jurisdictions are being kept to a minimum. In any case, a minimum antenna height of 100 feet above ground elevation will be necessary to provide clearance with roof lines and treetops. Any agency with its transmitter centrally located will be allowed a minimum service area radius of eight (8) miles - regardless of the size of its jurisdiction - as long as interference protection for existing co-channel and adjacent channel systems is sufficient.

## RESPONSIBILITY FOR CALCULATIONS

It will be the responsibility of the requesting agency to calculate the proposed service area and to validate the accuracy of the calculation. It is the requesting agency's responsibility to provide accurate system parameters and procure "height above average terrain" radials as specified in 90.309(a) (4) of the Commission's rules.

## PROPOSED SERVICE AREA EXHIBIT

An agency shall provide, along with its request for frequencies, an exhibit showing the calculated service area and the agency's jurisdictional boundaries. The boundaries must be drawn to scale on a 1:250,000 USGS map with a title block including the name of the requesting agency, height above average terrain, effective radiated power, latitude, longitude, ground elevation of the transmitting site, and the distance to the service area boundary in miles, as calculated. An example is included in Appendix 15 of this Plan.

## CONTROL STATION (Limit on Effective Radiated Power)

Control stations will be limited to an effective radiated power of no more than 6 dB above that of a mobile unit associated with the system. A list of control station locations, including latitude, longitude, effective radiated power, and height of antenna above ground level shall be provided with the request for frequencies.

## FREQUENCY REUSE

Careful adherence to the system technical design requirements of this Plan will allow for maximum co-channel usage within this region. Because of the close proximity of adjacent channel frequencies, adjacent channel considerations must be planned similar to that of co-channel design.

An agency requesting frequencies that have been previously licensed within this region or an adjacent region must show that their proposed system will operate on an interference-free basis with any existing co-channel system. Requesting agencies must demonstrate that the proposed system will provide an existing to proposed signal margin of at least 35 dB at the service area boundary of the existing system.

The signal strength of the proposed system is to be calculated by the same method as outlined in "Calculation of Service Area," elsewhere in this Plan.

After the distance from the proposed transmitter site to the existing service area contour is determined, the received signal strength of the proposed system can be found in the look-up tables using antenna height, effective radiated power, and distance. If it is determined that the margin of protection is insufficient, the proposed system must be modified to meet the protection criteria. A step-by-step procedure for performing the series of interference calculations is included in Appendix 16.

Adjacent Channel Design

Proposed systems must also be designed for interference-free operation with adjacent channel licensees. The method of determination is identical to that of co-channel design as detailed in "Co-channel Design," elsewhere in this Plan, with the exception of the existing to proposed signal margin criteria. In the case of adjacent channel systems, this margin will be reduced to 15 dB. All other calculations will remain the same.

It should be noted that the FCC has adopted technical standards for transmitters which will reduce adjacent channel interference and permit closer geographical adjacent channel use; however, the Commission has not adopted improved receiver technical standards. It is the position of the Commission that receivers do not cause interference, nor do they threaten effective operation of the public safety network, as would substandard transmitters.

Because of the demand for limited spectrum, it is the intent of this Plan to provide efficient spectrum utilization within current technological capabilities. Agencies are encouraged to carefully consider the receiver selectivity specifications of any equipment to be purchased for use in the 821-824/866-869 band.

Absolute Mileage Separation

In any case where the service areas of adjacent or co-channel systems are separated by at least 50 miles, the interference

studies as set forth in this Plan are unnecessary because of free space and terrain losses.

## TRUNKING REQUIREMENT

As referenced in the national element, trunking is mandated for any new system with more than four channels in the 800 Mhz band when located at a single transmitting site. Requests for exceptions will be considered by the Regional Review Committee for mobile data use, encryption, and telemetry stations. Other requests for waiver of the trunking requirement will be considered after presentation of evidence by the requesting agency. Approval to waive the trunking requirement will be based on the individual merits of the presentation.

## SYSTEM LOADING REQUIREMENT

### Single Frequency Systems

An agency requesting a single frequency to replace a frequency currently in use that will be turned back for reassignment will not be required to meet loading requirements in order to obtain the new frequency. However, if the single frequency is not loaded to more than 50 units within three years after the license is granted, the frequency will be available for assignment to other agencies on a shared basis in the event that other frequencies meeting the criteria for assignment are exhausted. Shared use of a frequency is not interference free. Users of single frequency systems may be required to provide the Regional Review Committee "confirmation of loading" for mobiles and portables as a method of validating system loading.

This exception shall apply to agencies which have only one system and a single frequency. Agencies requesting additional frequencies or having multiple systems shall comply with the loading standards as outlined below or provide a "Traffic Loading Study" that meets the criteria as outlined below.

LOADING TABLES

| EMERGENCY | | NONEMERGENCY | |
|---|---|---|---|
| CHANNELS | UNITS/CHANNEL | CHANNELS | UNITS/CHANNEL |
| 1 - 5 | 70 | 1 - 5 | 80 |
| 6 - 10 | 75 | 6 - 10 | 90 |
| 11 - 15 | 80 | 11 - 15 | 105 |
| 16 - 20 | 85 | 15 - 20 | 120 |

Agencies requesting additional frequencies must show loading of 100 percent or greater on their existing system. Should a demand for frequencies exist after assignable frequencies become exhausted, any system having frequencies assigned under this Plan four or more years previously and not loaded to at least 70 percent will lose operating authority on a sufficient number of frequencies to bring the system into compliance with the 70 percent loading standard. Frequencies lost in this manner will be reallocated to other agencies to help satisfy the demand for additional frequencies.

Traffic Loading Study

Justification for adding frequencies, or retaining existing frequencies, can be provided by a traffic loading study in lieu of loading by number of transmitters per channel. It will be the responsibility of the requesting agency to provide a verifiable study showing sufficient airtime usage to merit additional frequencies. A showing of airtime usage, excluding telephone interconnect air time, during the peak busy hour greater than 7-percent per channel on three consecutive days will be required to satisfy loading criteria.

**Slow Growth**

All systems in the 821-824/866-869 MHz bands under this plan will be slow growth in accordance with Section 90.629 of the Commission's rules.

## SYSTEM ENGINEERING REQUIREMENTS

System Engineering Exhibit

All requests to the Regional APCO Frequency Advisor for additional frequencies must include sufficient data to be able to determine proposed system operating parameters.

The system engineering exhibit (see Appendix 17) must show:

1. Transmit Output Power
2. Type of Cavities (duplexers and combiners) and Associated Losses
3. Type of Transmission Line and Associated Loss (including jumpers)
4. Antenna Model and Gain
5. Ground Elevation Above Mean Sea Level
6. Antenna Centerline AGL